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ficient basis to construct a revolutionary theory upon.

In the present pamphlet the author discourses at length upon the well-known fact that in all vertebrates there is an embryonic period at the close of which the anlagen of all are present, but not yet differentiated. This stage he calls the 'critical stage,' and he has tabulated the condition of the principal structures in various vertebrates at this stage. This table is a welcome addition to our embryological conveniences.

We have been unable to see that the elementary facts, which the author has collated, are anything more than what is commonly taught beginners in embryology, nor to recognize that they afford any arguments to support the author's theory of 'antithetic generation.' The established conception that the embryo is designed to provide undifferentiated tissue for development rests undisturbed, and offers a sufficient interpretation of embryos, without the interpolation of an antithetic hypothesis.

The note of personal exultation predominates in the pamphlet, and the author closes with the following words: "All the things mentioned above, and many more, are in agreement with the view of an antithetic alteration as underlying Metazoon development and—where are the *facts* that are opposed to it?" And echo answers—'where?'

C. S. M.

A Handbook of Rocks for use without the Microscope. By JAMES FURMAN KEMP. With a Glossary of the names of rocks and of other lithological terms.

This little book is arranged to meet the special needs of those 'engaged in ordinary field work or in mining or engineering enterprise,' and to present for their use the main facts of petrography in a convenient, compact and intelligible form. As the men who nowadays are engaged in such work or in directing such enterprise usually obtain their preliminary knowledge at one or other of our technical schools or colleges, the book will prove of especial value to students in such institutions to be used for private reading in connection with their lectures and demonstrations. A thorough knowledge of the science of petrography, as of

the allied sciences, botany or zoology, can, only be obtained by the continuous use of the microscope; the book, therefore, does not pretend to be a complete petrographical treatise, but for the purpose of the class of students for whom it is intended it contains an admirable presentation of the subject.

The various rock-forming minerals are first described and the principles of petrographical classification explained. Five chapters are then devoted to the Igneous Rocks. The student's attention is especially directed to the chemical composition of the several rocks, a series of analyses of each group being presented and commented upon. The mineralogical composition and relationship of the rocks of this class are excellently summed up in a tabular form on page 18, and are also represented graphically by means of diagrams which, however, would be rendered clearer if drawn to a larger scale.

The aqueous or sedimentary rocks are then taken up and finally the processes of metamorphism are explained and the principal representatives of the group of the metamorphic rocks are described.

It seems, however, unfortunate that the author has seen proper to include among the metamorphic rocks all the products of ordinary atmospheric weathering and decay, so that common clay, if a residual product, is classed as a metamorphic rock. This stretching of Lyell's original definition of metamorphism to include all alteration products of whatever kind is hardly advisable. The products of heat and pressure and those of ordinary superficial weathering are too diverse to be properly included in the same class, even if one were not willing to go so far as Prof. Dana and eliminate from the class of metamorphic rocks all those rocks which are products of alterations which take place at ordinary temperatures.

Appended to the book is an excellent glossary of rock names, which will prove of great value to beginners as well as to more advanced students, for, as Prof. Kemp observes: "One only needs to compile a glossary to appreciate what numbers of unnecessary and ill-advised names for rocks burden this unfortunate branch of science and to convince one that the philological petrographer comes near to being the

enemy of his kind." This glossary is to a certain extent based upon Loewinson-Lessing's Petrographisches Lexikon and the index of Zirkel's Lehrbuch der Petrographie, but contains many additional names of American origin. As an index of rock names it is very full and correct, although a few unimportant slips were observed. The name Anarthosite, for instance, was proposed by Hunt as far back as 1863 (See Geology of Canada, p. 22), six years before the publication of the paper in the *American Journal of Science*, to which reference is made. Perthite again was not named by Hunt, but by Dr. Thompson, of Perth, while composite dykes are not in all cases formed by two intrusions of different age occupying the same fissure, but in some cases result from magmatic differentiation in a single injection.

The book is clearly written, and the fact that it deals chiefly with American rocks and American localities gives it for American students a distinct advantage over many of the text-books which are published abroad.

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Prantl's Lehrbuch der Botanik, herausgegeben and neu arbeitet von DR. FERDINAND PAX, ord. Professor der Botanik und Direktor des botanischen Gartens in Breslau. Mit 397 figuren in Holzschnitt. Zehnte, verbesserte und vermehrte Auflage. 8vo., pp. x+406. Leipzig, Wilhelm Engelmann. 1896. Brosch. M. 4; gebund. M 5. 30.

A text-book of botany which has passed into its tenth edition has demonstrated its fitness to meet existing conditions in its native country. Whether those conditions are good or bad is quite another question. They certainly seem to demand in Germany a book largely devoted to an account of the various groups of plants. Indeed courses upon *Systematik* are much commoner in German universities and *Hochschulen* than in this country, given over as its elementary instruction has been to 'analysis.' It would almost appear that classification there takes the place of 'analysis' here, with little advantage, if any, in favor of the German student.

The tenth edition, the reviser tells us, has

been augmented both in text and illustrations, and many of the older figures replaced by better ones. This appears chiefly in the systematic part, for which the treasurers of the *Pflanzenfamilien* have been drawn upon; but no striking novelties appear in the other parts, where the good old 'stand-bys' are much in evidence still.

The 'tief greifende Veränderungen in der Anordnung des Stoffes,' which Dr. Pax did not think it wise to make, because the present arrangement had been approved by use, seem to us the very changes which were most called for in order to make the tenth edition as valuable to this generation as the first was twenty-two years ago. For according to modern ideas a text-book which devotes 100 pages to morphology, 47 to physiology and 237 to classification, is badly balanced; it is overdoing system at the expense of life. This is all the more striking when two-thirds of the classification is of the 'dry bones' order. Of the 237 pages of 'systematische Uebersicht des Pflanzenreiches,' 164 are devoted to the phanerogams, and in them one finds the same dreary iteration of the details of flower structure that has been our portion these many years. In the 73 pages on cryptogams comparative special morphology is given chief attention, but the parts shift as soon as the phanerogams are reached. Though Dr. Pax naturally wished to keep as close to Prantl's plan as possible, who would have found fault had he shown the courage to maintain the same plan for the phanerogams as for the cryptogams? Possibly the publisher; hardly the readers.

Part II., on physiology, is much too short for a satisfactory account of plant functions, and it might have been further revised to advantage in many particulars which we cannot specify. The account of molecular structure (if it is to be given at all) and the section on water movement are two notable examples. Sex terms and the sexual and non-sexual phases are properly explained in the very brief chapter on reproduction, but when the unsuspecting reader reaches the angiosperms he will be bewildered by the application of the same terms to the flowers and even to the sporophyte!

In anatomy the Gaul-like division of all tis-